CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory
An ISO 9001:2008 Certified Company
NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.04/KRIDL/WMM/AIV/2015-16 29.10.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
Reference	BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	29.10.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	304	
4	Aggregate Impact value = percent fines	20.94	21.04	
	100* (W_2/W_1)%			20.99

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Civil-Tech Consultants & Engineers Bangalore

Note:

→ This test report should not be reproduced except in full, without written approval of the laborato

→ The results indicated above are based on the tests carried out on the samples received in the labo

→ Any Query regarding the report must be reported within 30 days from the date of testing.

****

Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.04/KRIDL/WMM/S-T/2015-16 29.10.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of Work	Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
Reference	BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	29.10.2015

Result : Flakiness Index = **12.13%**

Elongation Index = **13.30%**

Result : Combined Flakiness & Elongation index **25.43%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

→ This test report should not be reproduced except in full, without written approval of the laboratory

→ The results indicated above are based on the tests carried out on the samples received in the laborat

→ Any Query regarding the report must be reported within 30 days from the date of testing.

****

Civil-tech Consultants & Engineers

#23/14, 7th Cross 3rd Stage 4th Block,
Shakth Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No: CTCE/BBMP/W.No.04/KRIDL/CSR-10/982f/SDBC(QB)/2016-17 02.11.2016

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
*AGENCY	:	**Technical Manager (West),** KRIDL, Bangalore.
*NAME OF THE WORK	:	Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
REFERENCE	:	BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
*SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	31.10.2016
PERIOD OF TESTING	:	02.11.2016

The results of the tests conducted on the bitumen sample using for Semi Dense Bituminous Concrete.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	66	60 to 70
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	46	Min. 45
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 50
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	298	Min. 220

*Information is furnished by the Customer/Representative.

Civil-Tech Consultants & Engineers Bangalore

Note:

⇒ This test report shall not be reproduced except in full, without written approval of the laboratory.

⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory.

⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

VIDYARANI P.K.
Technical Manager

****

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.04/KRIDL/SDBC/AIV/2015-16 02.11.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
Reference	BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
28.07.2014	02.11.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	390	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	308	304	
4	Aggregate Impact value = percent fines	21.03	22.45	
	100* (W_2/W_1)%			21.74

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Note:

Þ This test report should not be reproduced except in full, without written approval of the laboratory

Þ The results indicated above are based on the tests carried out on the samples received in the laboratory

Þ Any Query regarding the report must be reported within 30 days from the date of testing.

****

Civil-tech Consultants & Engineers

#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory
An ISO 9001:2008 Certified Company
NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Shape_T/2014-15 : 02.11.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalor
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
Reference	: BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 02.11.2015

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.39%**

Elongation Index = **13.03%**

Result : Combined Flakiness & Elongation index **24.42%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

Note:

- This test report should not be reproduced except in full, without written approval of the laboratory
- The results indicated above are based on the tests carried out on the samples collected by the laboratory
- Any Query regarding the report must be reported within 30 daysfrom the date of testing

****

Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory
An ISO 9001:2008 Certified Company
NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.04/KRIDL//SDBC/Stripping/2015-16 03.11.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the work	Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
Reference	BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	03.11.2015

Type of binder : 60/70
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

Civil-Tech Consultants & Engineers Bangalore

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

Note:

Þ This test report should not be reproduced except in full, without written approval of the laboratory

Þ The results indicated above are based on the tests carried out on the samples received in the laboratory

Þ Any Query regarding the report must be reported within 30 days from the date of testing.

****

Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.04/KRIDL/SDBC/Sp_Wa/2015-16 03.11.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
Reference	BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	03.11.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2019	2020	2022	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1264	1265	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2016	2017	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	751	751	750	
6	Weight of oven dried aggregate	W_4 g	2005	2006	2000	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.670	2.671	2.667	2.669
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.706	2.707	2.729	2.714
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.50%	0.50%	0.85%	0.62%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

Civil-Tech Consultants & Engineers Bangalore

Note:

Þ This test report should not be reproduced except in full, without written approval of the laboratory

Þ The results indicated above are based on the tests carried out on the samples received in the laboratory

Þ Any Query regarding the report must be reported within 30 days from the date of testing.

****

Civil-tech Consultants & Engineers

#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.04/KRIDL/SDBC/AGG/2015-16 03.11.2015

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
Reference	BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	03.11.2015

Total Weight of Sample: **5050** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	390	7.7	7.72	92.28	90-100	
4.75	2655	52.6	60.30	39.70	35-51	
2.36	685	13.6	73.86	26.14	24-39	
1.18	455	9.0	82.87	17.13	15-30	
0.3	320	6.3	89.21	10.79	9-19	
0.075	300	5.9	95.15	4.85	3-8	

Total Weight of Sample: **5150** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	320	6.2	6.21	93.79	90-100	
4.75	2505	48.6	54.85	45.15	35-51	
2.36	800	15.5	70.39	29.61	24-39	
1.18	560	10.9	81.26	18.74	15-30	
0.3	385	7.5	88.74	11.26	9-19	
0.075	355	6.9	95.63	4.37	3-8	

Note:

- This test report should not be reproduced except in full, without written approval of the laboratory
- The results indicated above are based on the tests carried out on the samples received in the laboratory
- Any Query regarding the report must be reported within 30 days from the date of testing.

****

Civil-tech Consultants & Engineers, Bangalore

Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.04/KRIDL/SDBC/Stability/2015-16 03.11.2015

TEST REPORT ON STABILITY OF MIX

Client	:	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (West),** KRIDL, Bangalore.
Name of the Work	:	Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.
Reference	:	BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	03.11.2015

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, Kn	8.50	8.90	8.2 Kn (min)
2	Marshal flow, mm	3.10	3.25	2 – 4
3	Percent air voids in Mineral Aggregate	4.05	4.20	3 – 5
4	Voids in Compacted Mix	13.55	14.10	13 – 15
5	Percent Voids filled with Bitumen	66.70	68.50	65 - 78
6	Density, g/cc	2.27	2.28	--

Civil-tech Consultants & Engineers Bangalore

Note:

⇒ This test report shall not be reproduced except in full, without written approval of the laboratory.

⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory.

⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

Civil-tech Consultants & Engineers
#23/14, 7th Cross 3rd Stage 4th Block,
Shakthi Ganapathinagar,
Basaveshwaranagar, Bangalore-560 079.

CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.04/KRIDL/WMM/Gradation/2015-16

29.10.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, Bangalore.

Name of Work : Improvements of drain and asphalting to 22nd cross roads in Judicial layout in Ward No.04, BBMP, Bangalore.

Reference : BBMP/EE(YNK.D)/W.O/108/2014-15 Dated: 20.02.2015

Date of Testing : 29.10.2015

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 7435

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	250	250	3.4	96.6	95-100
22.4	2285	2535	34.1	65.9	60-80
11.2	1205	3740	50.3	49.7	40-60
4.75	1000	4740	63.8	36.2	25-40
2.36	965	5705	76.7	23.3	15-30
0.600	925	6630	89.2	10.8	8-22
0.075	445	7075	95.2	4.8	0-8

Note:

1. The report shall not be reproduced, except in full, without the written approval of the laboratory.
2. The results indicated above are based on the tests carried out on the samples received in the laborat
3. Any Query regarding the report must be reported within 30 days from the date of testing.

Civil-Tech Consultants & Engineers Bangalore

M/s. Civil-Tech Consultants & Engineers
 # 23/14, 7th Cross, 3rd Stage,
4th Block, Shakthiganapathinagara,
Basaveshwaranagar,
Bangalore-560079.